4907/tat "PATENT APPLICATION"

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Before the Board of Patent Appeals and Interferences

In re Application of

JEAN-PIERE TAHON ET AL

U.S. Serial No. 09/689,632

Filed: October 13, 2000

LIQUID CRYSTAL ALIGNMENT LAYER

APPEAL No.

Group Art Unit 1772

S. Hon, Examiner

- - - - - -

Alexandria, Virginia
April 4, 2005

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

B R I E F O N A P P E A L

Dear Sir:

This appeal is from the action of the Primary Examiner mailed July 2, 2004 rejecting claims 4, 5, 7-12, 14 and 17.

Appellants' brief fee of $500 is attached. The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-3690 of the undersigned attorney.

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02 FC:1402 500.00 OP

Real Party in Interest

The named inventors of the captioned application have assigned their entire rights to Agfa-Gevaert, N.V., a corporation organized under the laws of Belgium, located in Mortsel, Belgium.

Related Appeals and Interferences

No appeal or interference is known to appellants which will directly affect or be directly affected by or have a bearing on the Board's decision in this pending appeal.

Status of Claims

The claims pending in this application are claims 4, 5, 7-12, 14 and 17.

The application as originally filed contained claims 1-16. Claims 4, 7, 8, 12 and 13 were amended and claims 1-3, 6, 15 and 16 were canceled by amendment dated April 17, 2003. Claims 1-3 and 15-16 were canceled as being non-elected in response to a restriction requirement. Claims 4, 8, 12 and 14 were amended, claim 13 was canceled and claim 17 was added by amendment dated September 2, 2003. Accordingly, the appealed claims are 4, 5, 7-12, 14 and 17

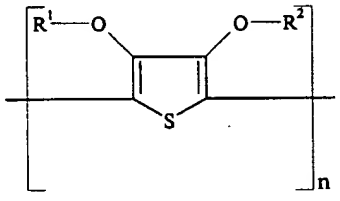
as set forth in the Appendix hereto. Claims 4, 8, 12, 14 and 17 are the independent claims.

Status of Amendments

A timely response was made on November 2, 2004 to the final official action mailed July 2, 2004. In the Advisory Action mailed November 22, 2004, the response is stated to be entered upon appeal.

Summary of Invention

The claimed invention relates to a liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of (i) providing a layer on a substrate, the layer comprising a polythiophene according to formula (I):

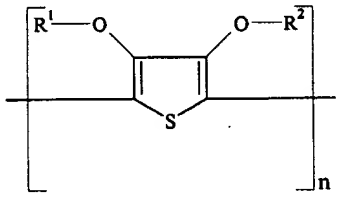


(I)

wherein R^1 and R^2 together represent a C_1-C_4 alkylene group or a cycloalkylene group, and (ii) mechanically rendering the layer liquid crystal aligning. (See page 5, lines 8-19). The liquid crystal alignment layer has a surface

resistivity lower than 10^5 Ω/□. (See page 13, lines 22-24). The liquid crystal alignment layer is a patterned layer including conducting and non-conducting areas and wherein the liquid crystal alignment layer is not removed at non-conducting areas. (See page 13, lines 25-32).

In another embodiment, the claimed invention relates to a liquid crystal device comprising a pair of substrates each having an electrode thereon and a liquid crystal disposed between the substrates, wherein at least one of the substrates is provided with a layer system comprising a liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of (i) providing a layer on a substrate, the layer comprising a polythiophene according to formula (I):

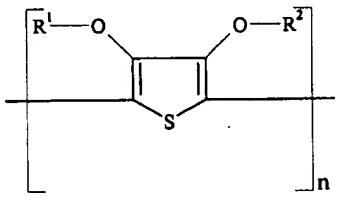


(I)

wherein R^1 and R^2 together represent a C_1-C_4 alkylene group or a cycloalkylene group, and (ii) mechanically rendering the layer liquid crystal aligning. (See page 5, lines 8-16, 20-25). Each of the substrates consists essentially of a material selected from the group consisting of poly(ethylene terephthalate), poly(ethylene naphthalate), polycarbonate,

polydicyclopentadiene, poly(ether sulfone), glass and a glass/plastic laminate. (See page 13, lines 7-16). Each of the substrates is provided with an electroconductive layer. (See page 14, lines 28-32). The electroconductive layer on at least one of the substrates comprises an indium-tin oxide layer. (See page 15, lines 3-4).

In another embodiment, the claimed invention relates to a liquid crystal device comprising a pair of substrates each having an electrode thereon and a liquid crystal disposed between the substrates, wherein at least one of the substrates is provided with a layer system comprising a liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of (i) providing a layer on a substrate, the layer comprising a polythiophene according to formula (I):

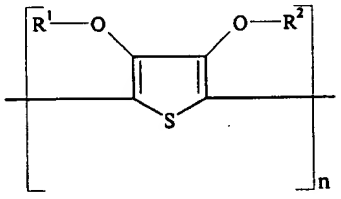


(I)

wherein R^1 and R^2 each independently represent hydrogen or a C_1-C_4 alkyl group or together represent a C_1-C_4 alkylene group or a cycloalkylene group, and (ii) mechanically rendering the layer liquid crystal aligning, wherein an

adhesion-improving anchor layer, having barrier properties with regard to oxygen and/or water vapor which may diffuse from the substrate, is provided between at least one of the substrates and the liquid crystal alignment layer. (See page 5, lines 8-16, 20-25; page 14, lines 2-19).

The claimed invention further relates to a liquid crystal display comprising a liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of (i) providing a layer on a substrate, the layer comprising a polythiophene according to formula (I):

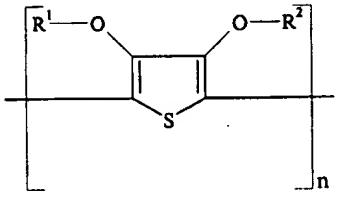


(I)

wherein R^1 and R^2 together represent a C_1-C_4 alkylene group or a cycloalkylene group, and (ii) mechanically rendering the layer liquid crystal aligning. (See page 5, lines 8-19).

The claimed invention also relates to a liquid crystal display comprising a liquid crystal device comprising a pair of substrates each having an electrode thereon and a liquid crystal disposed between the substrates, wherein at least one of the substrates is

provided with a layer system comprising a liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of (i) providing a layer on a substrate, the layer comprising a polythiophene according to formula (I):



(I)

wherein R^1 and R^2 together represent a C_1-C_4 alkylene group or a cycloalkylene group, and (ii) mechanically rendering the layer liquid crystal aligning. (See page 5, lines 8-16; 20-25).

Grounds of Rejection to be Reviewed on Appeal

The grounds of rejection of the present appeal are:

A. Whether claims 4-5, 7-10 and 14 are patentable under 35 U.S.C. § 103(a) over U.S. Patent No. 5,118,538 (Escher) in view of U.S. Patent No. 5,286,414 (Kämpf);

B. Whether claims 11-12 are patentable under 35 U.S.C. § 103(a) over Escher in view of Kämpf as applied above and further in view of U.S. Patent No. 5,465,169 (Eguchi); and

C. Whether claim 17 is patentable under 35 U.S.C. § 103(a) over Escher in view of Kämpf.

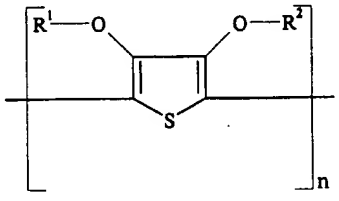
Argument

I. Rejections Under 35 U.S.C. § 103

The pending claims are 4, 5, 7-12, 14 and 17, wherein claims 4, 8, 12, 14 and 17 are the independent claims.

A. Rejection of Claims 4-5, 7-10 and 14 Under 35 U.S.C. § 103(a)

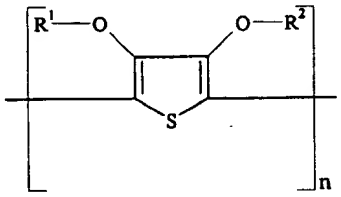
Claim 4 claims a liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of (i) providing a layer on a substrate, said layer comprising a polythiophene according to formula (I):



(I)

wherein R^1 and R^2 together represent a C_1-C_4 alkylene group or a cycloalkylene group, and (ii) mechanically rendering said layer liquid crystal aligning.

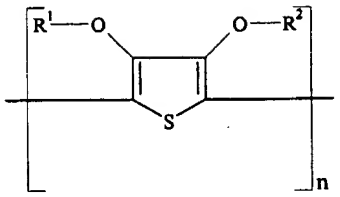
Claim 8 claims a liquid crystal device comprising a pair of substrates each having an electrode thereon and a liquid crystal disposed between said substrates, wherein at least one of said substrates is provided with a layer system comprising a liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of (i) providing a layer on a substrate, said layer comprising a polythiophene according to formula (I):



(I)

wherein R^1 and R^2 together represent a C_1-C_4 alkylene group or a cycloalkylene group, and (ii) mechanically rendering said layer liquid crystal aligning.

Claim 14 claims a liquid crystal display comprising a liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of (i) providing a layer on a substrate, said layer comprising a polythiophene according to formula (I):



(I)

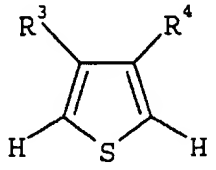
wherein R^1 and R^2 together represent a C_1-C_4 alkylene group or a cycloalkylene group, and (ii) mechanically rendering said layer liquid crystal aligning.

These claims are not rendered obvious by the applied art within the meaning of §103. The applied references of Escher and Kämpf fail to teach or suggest certain claimed features or requires the presence of other features which are inconsistent or teach away from the claimed invention. No suggestion is provided by the references to pick and choose isolated features and combine them to provide applicants' claimed invention.

The primary reference Escher does not disclose polythiophenes according to applicants' claimed formula (I) in which R^1 and R^2 together form an O-[C_1-C_4 alkylene]-O group or an O-[cycloalkylene]-O group. Escher discloses at column 4, lines 47-61, that owing to its good orienting properties (good planar orientation) and its high electrical conductivity, the use of a polymer of the formula (III) [poly(3-methoxythiophene) with a degree of polymerization of 5 or 6 and BF_4^- counterions] has proved particularly

advantageous for orienting layers in displays. Escher claims liquid crystal orienting properties for poly(3,4-dialkoxythiopene)s, but provides no enabling support for the possibility that poly(3,4-dialkoxy-thiophene)s or poly(3,4-dialkylenethiophene)s exhibit liquid crystal orienting properties. One skilled in the art would be aware of the fact that chemical species exhibit properties which are extremely dependent upon their chemical structure. Applicants thus submit that Escher does not teach or suggest that poly(3,4-dialkoxy-thiophene)s or poly(3,4-dioxy-alkylenethiophene)s exhibit liquid crystal orienting properties.

Escher also discloses at column 2, lines 12-62, that electrically conductive polymers, which are soluble in oxidized form in dipolar aprotic solvents at room temperature are derived from a monomer of the formula below:



where at least one of the two radicals R^3 and R^4 is an alkoxy group and the other is optionally (C_1-C_6)alkyl or hydrogen, and that such polymers have already been described in DE-A 3,717,668, DE-A 3,628,895 and DE-A 3,736,114.

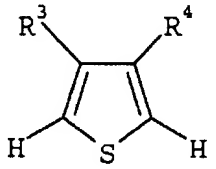
However, these documents do not teach poly(3,4-dioxyalkylene-thiophene)s. These documents as alluded to in Escher and Escher only teach polythiophenes substituted at the R^3 and R^4 positions with an alkoxy group, straight-chain or branched alkyl, hydrogen or halogen. These documents as alluded to in Escher and Escher do not teach R^3 and R^4 being alkylene or cycloalkylene attached to an oxygen as in the R^1 and R^2 positions of the $-O-R^1$ and $-O-R^2$ positions of the claimed invention. These documents as alluded to in Escher and Escher only disclose that R^3 and R^4 can be alkoxy (-OR), but does not teach R^3 and R^4 as an oxyalkylene. As known in the art, an alkoxy group is an alkyl radical attached to the remainder of the molecule by oxygen and is not an alkylene radical attached to the remainder of the molecule by oxygen. [See definition as submitted March 22, 2004 of "alkoxy", Hackh's Chemical Dictionary, 4th Ed., page 27 (1969)]. Furthermore, Escher provides no suggestion or indication that polythiophenes, other than those disclosed, could also exhibit similar properties.

The Examiner refers to DE-A 3,717,668, DE-A 3,628,895 and DE-A 3,736,114 as providing a disclosure of poly(3,4-alkylenedioxythiophene). However, none of these German applications were incorporated by reference into Escher. Nonetheless, these documents, as detailed in Escher

and described above, do not teach or suggest the claimed invention. Applicants thus submit that Escher does not teach or suggest poly(3,4-dioxyalkylenethiophene).

Kämpf is relied on by the Examiner on the basis of it being the U.S. equivalent of DE-A 3,717,668 and having been cited in Escher at column 2, lines 34-52 as follows:

> "Electrically conductive polymers, which are soluble in oxidized form in dipolar aprotic solvents at room temperature and which are derived from a monomer of the formula (II)



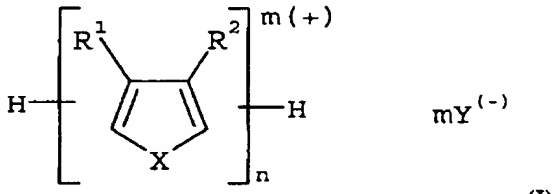
(II)

> where at least one of the two radicals R^3 and R^4 is an alkoxy group and the other is optionally (C_1-C_6) alkyl or hydrogen, have already been described in DE-A 3,717,668, DE-A 3,628,895 and DE-A 3,736,114. The preparation, the stability and electrical conductivity of the various, positively doped polymers were also investigated therein."

This passage refers to polymers derived from monomers of formula (II). One skilled in the art would regard such

polymers as a preferred embodiment of the polymers of formula (I). This is not inconsistent with being an alternate as asserted by the Examiner. The polymers of formula (II) are further defined polymers within the scope of formula (I). Since formula (II) is within the teaching of formula (I), R^3 and R^4 in formula (II) must correspond to R^1 and R^2 in formula (I), i.e. –

> "... an electrically conductive polymer which is composed of repetitive units of the formula (I):



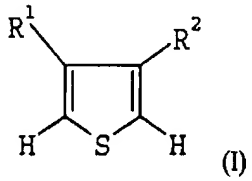
(I)

> where R^1, R^2 are independently of each other, H, or straight-chain or branched alkyl or alkoxy containing 1-16 carbon atoms, or halogen, ..."

The options for R^1 and R^2 in formula (II) therefore are within the definition for formula (I) and any implication to be drawn by one skilled in the art from the reference to DE-A 3,717,668, DE-A 3,628,895 and DE-A 3,736,114 with respect to formula (II) must be limited to being within the definition for R^1 and R^2 in formula (I). Such definitions do not include poly(3,4-dioxyalkylene-thiophene)s.

Additionally, these German applications are not incorporated by reference into Kämpf. Specifically, just because the Examiner states that Kämpf is the U.S. equivalent of DE-A 3,717,668, DE-A 3,717,668 is not automatically incorporated by reference into Kämpf. Applicants therefore respectfully traverse any assertion that the full disclosure of DE-A 3,717,668, DE-A 3,628,895 and DE-A 3,736,114 with regard to the definition of R^1 and R^2 in formula (I) can be incorporated into Escher as applied by the Examiner to broaden the disclosure of Kämpf.

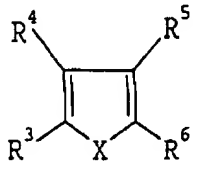
Kämpf discloses an electroconductive coating composition comprising 10 to 100% by weight of an oligomer having three to ten structural units which are connected to one another by a linkage in the two-position and/or five-position, on statistical average comprising 60 to 100% by weight of structural units derived from at least one monomer of the formula (I)



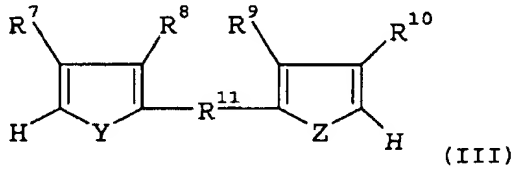
(I)

in which R^1 denotes a C_1-C_{12} alkoxy group or $-O(CH_2CH_2O)_nCH_3$ where n=1 to 4 and R^2 denotes a hydrogen atom, a C_1-C_{12} alkyl group, a C_1-C_{12}-alkoxy group, or $-O(CH_2CH_2O)_nCH_3$ where n=1 to

4, or R^1 together with R^2 represents $-O(CH_2)_m-CH_2-$ or $-O(CH_2)_m-O-$, in which m is 1 to 12, 0 to 40% by weight of structural units derived from at least one monomer of the formula (II)

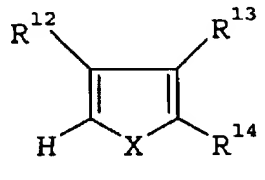

(II)

in which R^4 and R^5, independently of one another, denote a hydrogen atom, a halogen atom, a C_1-C_{12}-alkyl group or aryl or, together with the carbon atoms linking them, form an aromatic ring, R^3 and R^6, independently of one another, denote a hydrogen atom, or R^3 together with R^4 and the carbon atoms linking them, or R^5 together with R^6 together with the carbon atoms linking them, in each case form an aromatic ring, X denotes an oxygen atom, a sulfur atom, an =NH group, an =N-alkyl group or an =N-aryl group, 0 to 40% by weight of structural units derived from at least one monomer of formula (III)


(III)

in which R^7, R^8, R^9 and R^{10} independently of one another denote a hydrogen atom, a C_1-C_{12} alkyl group, a C_1-C_{12}-alkoxy

group or an aryl group, Y and Z, independently of one another, denote an oxygen atom, a sulfur atom, an =NH group, an =N-alkyl group or an =N-aryl group, R^{11} denotes an arylene group, a heteroarylene group or a conjugated system of the formula $-(CH=CH)-_o$, in which O is zero, 1, 2 or 3, 0 to 40% by weight of structural units derived from at least one monomer of the formula (IV)



(IV)

in which R^{12} and R^{13}, independently of one another, denote a hydrogen atom, a halogen atom, a C_1-C_{12}-alkyl group, a C_1-C_{12}-alkoxy group, a C_1-C_4-alkylamino group or a C_1-C_4-acylamino group, R^{14} denotes a halogen atom, a C_1-C_{12}-alkyl group, a C_1-C_{12}-alkoxy group, a C_1-C_4-alkylamino group or a C_1-C_4-acylamino group and X has the above-mentioned meaning, where the oligomer, in the oxidized form, is completely soluble in dipolar aprotic solvents at 25°C, and solutions having a content of at least 0.5 g of the oligomer in 100 ml of solvent are obtained at 25°C, and 0 to 90% by weight of a polymer which is dissolved or swollen in solvents or solvent mixtures having a δ_p value

greater than 3.5 $(cal/ccm)^{1/2}$ and δ_H value less than 6.5 $(cal/ccm)^{1/2}$.

Kämpf does not disclose preparation of poly(3,4-dioxyalkylenethiophene)s. The first disclosure of such polymers was in EP-A 339 340 which corresponds to U.S. Patent Nos. 4,959,430, 4,987,042 and 5,035,929. Further, while Kämpf purports to disclose solvent-soluble oligomers, poly(3,4-dioxyalkylenethiophene)s are insoluble and not swellable in solvent and solvent mixtures as disclosed in Kämpf. Thus, even if these polymers were to be regarded as enabled by Kämpf, Kämpf would not be in possession of the invention. Applicants therefore submit that Kämpf does not disclose poly(3,4-dioxyalkylene-thiophene)s to one skilled in the art.

Moreover, applicants submit that no suggestion is provided by Escher to modify the teachings of the applied art in order to obtain the claimed invention. Upon filing the application, Escher had the option to claim identical substituents for R^1 and R^2 in formula (I) as for R^3 and R^4 in formula (II). The fact that the applicants of Escher did not do so can be inferred to mean from the lack of teaching that they had reason to believe that polymers outside the scope of formula (I), but within the scope of formula (II), either did not function as orienting layers in liquid

crystal displays or were unknown. Applicants therefore submit that the fact that the applicants in Escher explicitly opted for narrower definitions for R^1 and R^2 than for R^3 and R^4 teaches away from one skilled in the art regarding formula (II) as an alternate to formula (I) in the invention of Escher and, thus, that in the disclosure of formula (I) of Escher the options for R^1 and R^2 in formula (II) of Escher cannot have a greater scope than those for formula (I) of Escher. Escher provides no suggestion or indication that polythiophenes, other than those disclosed in formula (I) could also exhibit similar properties. As to the German applications noted in Escher, i.e., DE-A 3,717,668, DE-A 3,628,895, DE-A 3,736,114, applicants do not refute the fact that one skilled in the art would look up these references. However, applicants do dispute what is in the teaching that one skilled in the art would seek from these references. The fact that the applicants in Escher upon filing Escher had the option to claim identical substituents for R^1 and R^2 in formula (I) as for R^3 and R^4 in formula (II) but failed to do so, can be inferred to mean in view of the lack of teaching that they had reason to believe that polymers outside the scope of formula (I), but within the scope of formula (II), either did not function as orienting layers in liquid crystal displays or were unknown.

Applicants therefore submit that the fact that the applicants in Escher explicitly opted for narrower definitions for R^1 and R^2 than for R^3 and R^4 teaches away from one skilled in the art regarding formula (II) as an alternate to formula (I) in the invention of Escher and hence that in the disclosure of formula (I) of Escher, the options for R^1 and R^2 in the formula (II) of Escher cannot have a greater scope than those for formula (I). Applicants therefore submit that one skilled in the art would only look up these references to seek information about the preparation, stability and electrical conductivity (see column 2, lines 49-51) of the polymers according to formula (I).

Thus, Escher teaches away from the present invention, since the applicants in Escher explicitly opted for narrower definitions for R^1 and R^2 than for R^3 and R^4. Furthermore, even were Kämpf to teach polymers derived from 3,4-dioxyalkylenethiophenes, this would be negated by the fact that Escher teaches away from using such polymers in the invention of Escher.

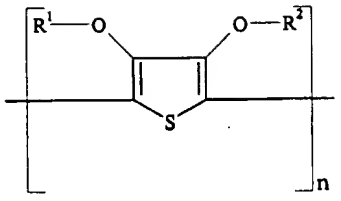
Accordingly, it is respectfully submitted that claims 4-5, 7-10 and 14 are not rendered obvious under 35 U.S.C. §103(a) over Escher in view of Kämpf since Escher and Kämpf, alone or in combination, do not teach or suggest each

and every element of the claimed invention. No motivation or desirability is taught or suggested that would lead one skilled in the art to modify the explicit teachings of the applied references in order to obtain the applicants' claimed invention. The mere fact that the prior art can be modified does not make the modification obvious unless the prior art suggests the desirability of the modification. Applicants respectfully submit that such suggestion is missing in the presently applied art. Withdrawal of the rejections under 35 U.S.C. §103 of claims 4-5, 7-10 and 14 is respectfully requested.

B. Rejection of Claims 11-12
Under 35 U.S.C. § 103(a)

Claim 11 depends from Claim 10 (which was discussed in section I.A.) and specifically claims that the electroconductive layer on at least one of the substrates comprises an indium-tin oxide layer.

Claim 12 claims a liquid crystal device comprising a pair of substrates each having an electrode thereon and a liquid crystal disposed between said substrates, wherein at least one of said substrates is provided with a layer system comprising a liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of (i) providing a layer on a substrate, said layer comprising a polythiophene according to formula (I):



(I)

wherein R^1 and R^2 each independently represent hydrogen or a C_1-C_4 alkyl group or together represent a C_1-C_4 alkylene group or a cycloalkylene group, and (ii) mechanically rendering said layer liquid crystal aligning, wherein an adhesion-improving anchor layer, having barrier properties with regard to oxygen and/or water vapor which may diffuse from said substrate, is provided between at least one of said substrates and said liquid crystal alignment layer.

Escher, Kämpf and Eguchi, alone or in combination, do not teach or suggest the claimed invention of claims 11 and 12. Escher and Kämpf do not teach or suggest the claimed invention as set forth above in Section I.A. Applicant reasserts the above arguments as to Escher and Kämpf herein as to claims 11 and 12.

Eguchi is relied on for teaching the additional features of an adhesion-improving anchor layer which has barrier properties to compounds which may diffuse from the substrate, and an electroconductive layer (electrode) made out of indium tin oxide. The primary reference to Escher is acknowledged by the Examiner to not teach these elements.

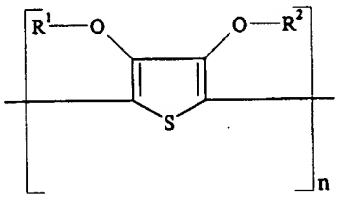
Eguchi distinguishes between the presence of an alignment material and of a polymeric electroconductive compound in the alignment film. Further, Eguchi exemplifies polyimide liquid crystal alignment materials and polyaniline, polypyrrole and poly-2,5-thienylene vinylene polymeric electroconductive compounds.

Since Escher and Kämpf do not teach or suggest the claimed invention as set forth above, and Eguchi is only relied on for teaching additional isolated limitations with respect to claims 11-12, applicants submit that Eguchi does not make up for the shortcomings of the primary combination of Escher and Kämpf. Accordingly, applicants submit that the combination of Escher, Kämpf and Eguchi does not render claims 11 and 12 obvious within the meaning of 35 U.S.C. §103. No teaching or suggestion is provided to modify the disclosures as asserted by the Examiner to provide the claimed invention.

C. Rejection of Claim 17
Under 35 U.S.C. §103(a)

Claim 17 claims a liquid crystal display comprising a liquid crystal device comprising a pair of substrates each having an electrode thereon and a liquid crystal disposed between said substrates, wherein at least one of said substrates is provided with a layer system comprising a liquid crystal alignment layer obtained by a

method of making a liquid crystal alignment layer comprising the steps of (i) providing a layer on a substrate, said layer comprising a polythiophene according to formula (I):



(I)

wherein R^1 and R^2 together represent a C_1-C_4 alkylene group or a cycloalkylene group, and (ii) mechanically rendering said layer liquid crystal aligning. Escher and Kämpf, alone or in combination do not teach or suggest the claimed invention of claim 17. Applicants respectfully reassert as to claim 17 the arguments as set forth above with respect to the other § 103 rejection based on Escher in combination with Kämpf. As noted by the Examiner, claim 17 includes the limitations of claim 8, except that claim 17 includes the additional limitation of being a "liquid crystal display" including such device.

Accordingly, applicants respectfully submit that claim 17 is not rendered obvious within the meaning of 35 U.S.C. §103 over Escher in view of Kämpf.

II. Supporting Case Law

None of the prior art relied upon teaches every element of the claimed invention and, accordingly, there is no anticipation within the meaning of 35 U.S.C. § 102. Realizing this, the Examiner relies on 35 U.S.C. § 103. Accordingly, since none of the references teach all of the elements of the claims, it is necessary that there be some basis in the references which would cause one skilled in the art to combine the particular teachings to come up with the claimed invention. In the present instance, applicants submit that there is simply nothing in the applied art which would lead one skilled in the art to conclude that a method of making a liquid crystal alignment layer and a liquid crystal alignment layer could be obtained as in the present invention.

Applicants submit that it is clear that the burden of establishing a prima facie case of obviousness requires a showing of some objective teaching in the prior art or from knowledge generally available to one of ordinary skill in the art that would lead that individual to combine the relevant teachings of the references. Ex parte Levengood, 28 USPQ2d 1300, 1302 (BPAI 1993). An Examiner cannot establish obviousness by locating references which describe various aspects of a patent applicant's invention without

also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done. Ex parte Levengood, supra, at 1302.

The Court of Appeals for the Federal Circuit in In re Dow Chemical Co., 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988), stated -

> "The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. [References omitted] Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure.
>
> "In determining whether such a suggestion can fairly be gleaned from the prior art, the full field of the invention must be considered; for the person of ordinary skill is charged with knowledge of the entire body of technological literature, including that which might lead away from the claimed invention."

Deficiencies in the factual basis cannot be supplied by resorting to speculation or unsupported generalities. See In re Warner, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967) and In re Freed, 425 F.2d 785, 165 USPQ 570 (CCPA 1970).

Further, the mere fact that the prior art can be modified does not make the modification obvious unless the prior art suggests the desirability of the modification. In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125 (Fed. Cir. 1984). Once appellant's solution to a problem is disclosed, it is easy to see how prior references can be modified and

manipulated to produce the claimed invention. The change can appear simple and by hindsight seem obvious. However, as stated by the Court in In re Sporck, 133 USPQ 360, 363 (CCPA 1962), the simplicity of new inventions is oftentimes the very thing that is not obvious before they are made. The Court goes on to cite as support In re Osplack, 195 F.2d 921, 923-924, 93 USPQ 306, 308 (CCPA 1952) stating –

> "We think this case is one of that category of inventions which, when viewed after disclosure and explanation by an applicant, seem simple and such as should have been obvious to those in the field. Yet this does not necessarily negative invention or patentability. [citations omitted] Indeed, simplicity may even be some evidence of invention. [citations omitted]."

The Examiner is selecting select parts of the prior art disclosures based on appellant's own teaching. This is using improper hindsight. Thus, as the Court of Appeals for the Federal Circuit stated in In re Rouffet, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998) –

> "As this court has stated, 'virtually all [inventions] are combinations of old elements.' *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 698, 218 USPQ 865, 870 (Fed. Cir. 1983); *see also Richdel, Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1579-80, 219 USPQ 8, 12 (Fed. Cir. 1983) ('Most, if not all, inventions are combinations and mostly of old elements.). Therefore an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner

> to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be 'an illogical and inappropriate process by which to determine patentability.' *Sensonics. Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570, 38 USPQ2d 1551, 1554 (Fed. Cir. 1996).
>
> "To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed."

In the case at hand, there is no motivation to pick and choose only select parts from a plurality of references as applied by the Examiner.

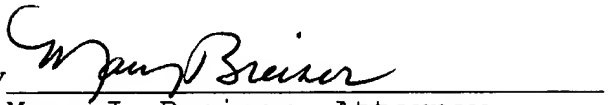
Accordingly, applicants respectfully submit that none of the applied combinations of art teach or suggest the claimed invention within the meaning of 35 U.S.C. § 103.

Conclusion

It is respectfully submitted that the appealed claims are patentable within the meaning of 35 U.S.C. § 103. Reversal of the Examiner's rejections is, therefore, respectfully urged.

Respectfully submitted,

JEAN-PIERRE TAHON ET AL

By 

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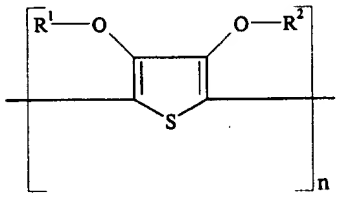
Attachments - Appendix
- $500.00 Brief Fee

The Appealed Claims:

4. A liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of:

(i) providing a layer on a substrate, said layer comprising a polythiophene according to formula (I):



(I)

wherein R^1 and R^2 together represent a C_1-C_4 alkylene group or a cycloalkylene group; and

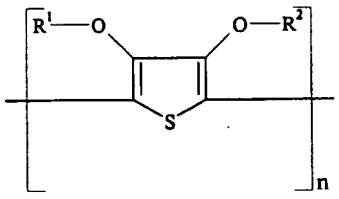
(ii) mechanically rendering said layer liquid crystal aligning.

5. Liquid crystal alignment layer according to claim 4 having a surface resistivity lower than 10^5 Ω/□.

7. Liquid crystal alignment layer according to claim 4, wherein said liquid crystal alignment layer is a patterned layer including conducting and non-conducting areas and wherein said liquid crystal alignment layer is not removed at non-conducting areas.

8. A liquid crystal device comprising a pair of substrates each having an electrode thereon and a liquid crystal disposed between said substrates, wherein at least one of said substrates is provided with a layer system comprising a liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of:

(i) providing a layer on a substrate, said layer comprising a polythiophene according to formula (I):



(I)

wherein R^1 and R^2 together represent a C_1-C_4 alkylene group or a cycloalkylene group; and

(ii) mechanically rendering said layer liquid crystal aligning.

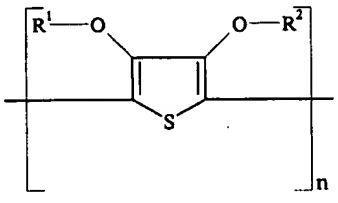
9. Liquid crystal device according to claim 8, wherein each of said substrates consists essentially of a material selected from the group consisting of poly(ethylene terephthalate), poly(ethylene naphthalate), polycarbonate, polydicyclopentadiene, poly(ether sulfone), glass and a glass/plastic laminate.

10. Liquid crystal device according to claim 8, wherein each of said substrates is provided with an electroconductive layer.

11. Liquid crystal device according to claim 10, wherein said electroconductive layer on at least one of said substrates comprises an indium-tin oxide layer.

12. A liquid crystal device comprising a pair of substrates each having an electrode thereon and a liquid crystal disposed between said substrates, wherein at least one of said substrates is provided with a layer system comprising a liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of:

(i) providing a layer on a substrate, said layer comprising a polythiophene according to formula (I):



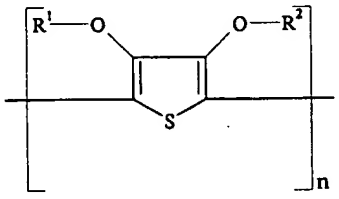
(I)

wherein R^1 and R^2 each independently represent hydrogen or a C_1-C_4 alkyl group or together represent a C_1-C_4 alkylene group or a cycloalkylene group; and

(ii) mechanically rendering said layer liquid crystal aligning, wherein an adhesion-improving anchor layer, having barrier properties with regard to oxygen and/or water vapor which may diffuse from said substrate, is provided between at least one of said substrates and said liquid crystal alignment layer.

14. A liquid crystal display comprising a liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of:

(i) providing a layer on a substrate, said layer comprising a polythiophene according to formula (I):



(I)

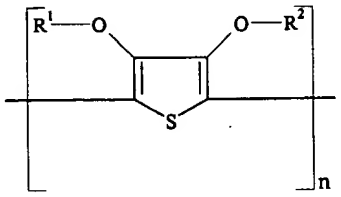
wherein R^1 and R^2 together represent a C_1-C_4 alkylene group or a cycloalkylene group; and

(ii) mechanically rendering said layer liquid crystal aligning.

17. A liquid crystal display comprising a liquid crystal device comprising a pair of substrates each having an electrode thereon and a liquid crystal disposed between

said substrates, wherein at least one of said substrates is provided with a layer system comprising a liquid crystal alignment layer obtained by a method of making a liquid crystal alignment layer comprising the steps of:

(i) providing a layer on a substrate, said layer comprising a polythiophene according to formula (I):



(I)

wherein R^1 and R^2 together represent a C_1-C_4 alkylene group or a cycloalkylene group; and

(ii) mechanically rendering said layer liquid crystal aligning.

* * * * *